

SONY International (Europe) GmbH
 „OFDM Pre-Equalizing“
 P24597 EP

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Claims:

1. Method for adjusting the transmission characteristics of subcarriers of a multi-carrier transmission system using a plurality of antenna elements,
 the method comprising the following steps at the transmitting side:
 - 10 - detecting (11, 11') the subcarrier frequency channel (2, 2') characteristics of the multicarrier transmission, and
 - pre-equalizing (1, 1', 10, 10') the power of each subcarrier by dividing it by the amplitude characteristics of the corresponding subcarrier frequency channel (2, 2') or all subcarrier frequency channels to compensate for the power profile of the channel(s)
 - 15 (2, 2').
2. Method according to claim 1,
 characterized in that
 in the step of pre-equalizing the power of the subcarriers is divided (10, 10') by the
 - 20 sum of the squared magnitude of the frequency channel characteristics of all antennas.
3. Method according to claim 1,
 characterized in that
 in the step of pre-equalizing the transmission signal is divided (1, 1') by the magnitude
 - 25 of the channel response vector.
4. Method according to claim 1,
 characterized in that
 in the step of pre-equalizing the transmission signal is divided by the channel response
 - 30 vector.
5. Method according to claim 1 or 2,

characterized in that

in the pre-equalizing step (10, 10') furthermore the phase of the subcarrier signals is respectively compensated at the transmission side according to the detected frequency channel characteristics (11, 11').

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6. Method according to anyone of the preceding claims,
characterized in that

depending on the detected frequency channel characteristics (11, 11') at each antenna element (3, 3') for each subcarrier signal the antenna element (3, 3') having the best
10 channel characteristics (11, 11') for said subcarrier signal is used for transmission (2, 2').

7. Method according to anyone of claims 1 to 5,
characterized in that

15 the power of the transmission signal is distributed to all antenna elements according to the subcarrier frequency characteristics of the corresponding antenna element (3, 3').

8. Method according to anyone of the preceding claims,
characterized in that

20 the pre-equalization (1, 1') of the power of the subcarrier signal is limited to an upper threshold.

9. Method according to claim 8,
characterized in that

25 in case along with equalization (1, 1') the upper threshold is reached for a subcarrier signal, the transmission power of the corresponding subcarrier signal is fixed at the upper threshold value and the modulation scheme for said subcarrier signal is adapted.

10. Method according to claim 9,
30 characterized in that
the adaptation of the modulation scheme of a subcarrier signal is signaled to the receiving side (6).

11. Method according to claim 9 or 10,

to adapt the modulation scheme of a subcarrier signal, the modulation scheme is simplified.

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12. Method according to claim 9 to 11,

to adapt the modulation scheme of a subcarrier signal, the subcarrier signal is not modulated at all.

10 13. Method according to anyone of claims 9 to 12,

in case the modulation scheme of a subcarrier signal is adapted to reduce the bit rate of this subcarrier signal, the modulation scheme of at least one other subcarrier signal is changed to a more complex modulation scheme.

15 14. Method according to anyone of the preceding claims,

characterized in that

the detection (11, 11') of the frequency channel characteristics is performed on the basis of received pilot symbols.

20 15. Computer software program product,

characterized in that

it implements a method according to anyone of the preceding claims when run on a computing device of a transmitting device.

25 16. Transmission diversity device adapted for adjusting the transmission characteristics of subcarriers of a multicarrier transmission system and having a plurality of antenna elements (3, 3'),

the transmission diversity device (5) comprising:

- means (11, 11') for detecting the frequency subcarrier channel (2, 2') characteristics
- 30 of the multicarrier transmission, and
- a pre-equalizer (1, 1') for dividing the transmission signal by the amplitude characteristics of the corresponding subcarrier channel (2, 2').

17. Device according to claim 16,
characterized in that
the pre-equalizer (1, 1') furthermore comprises a division means (10, 10') dividing the
5 subcarrier signals respectively by the sum (9) of the squared magnitude of the frequency
channel characteristics of all sub-carrier signals.

18. Device according to claim 16 or 17,
characterized in that
10 it further more comprises a phase compensator (1, 1') for adjusting the phase of the
subcarriers respectively according to the detected frequency channel characteristics (11,
11').

19. Device according to anyone of the claims 15 to 18,
15 characterized in that
the equalizer (1, 1') limits the power of the subcarrier to an upper threshold.

20. Device according to anyone of claims 15 to 19,
characterized in that
20 it is a base station (5) of a wireless transmission system.